Royal Ontario Museum of Zoology

Handbook No. 3

THE AMPHIBIANS OF ONTARIO

by

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The Amphibians of Ontario*

The amphibians of Ontario include the frogs, tree-frogs, toads, and salamanders.

Everyone is familiar with the appearance of frogs and toads, but many are unable to distinguish between a salamander and a lizard. A lizard is a reptile, and hence, like a snake, is covered with scales, whereas salamanders are tailed amphibians and, like frogs and toads, lack scales.

Most amphibians lay their eggs in the water (a few in damp situations on land). During their early life the young are furnished with gills (Fig. 1, g) and tails (Figs. 1 and 2, t) and are known as tadpoles (Figs. 1 and 2). They are often quite unlike the adults in appearance. In salamander tadpoles the gills are always external (Fig. 1, g), but in frogs and toads, while the gills are external in newly hatched tadpoles, they are soon covered by flaps of skin that grow back over them. A small opening, the spiracle (Fig. 2, sp) remains to allow the escape of used water from within the gill covers. Frog and toad tadpoles lose their gills and tails when assuming the adult form; salamanders, while usually losing their gills, retain the tail throughout life.

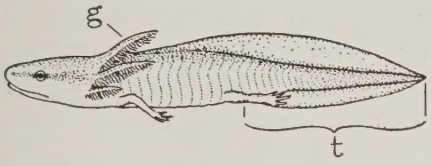

Figure 1
Salamander tadpole.

In salamander tadpoles the mouth is as large and wide, or nearly so, in proportion to the animal, as it is in adult life and the jaws are furnished with true teeth. In frog tadpoles the mouth is much smaller and of quite different construction. The jaws are small horny mandibles, and large lips are developed and furnished with rows of minute horny teeth. This difference in the larval† mouth and teeth is associated with different methods of feeding. Salamander larvae feed upon other animals which are seized in the jaws and swallowed alive, while frog tadpoles are mostly vegetable feeders and scavengers and their horny jaws and lip teeth are used in rasping off tiny particles of food.

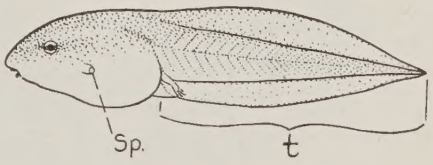

Figure 2
Frog tadpole.

*Reprinted from THE SCHOOL, April, May, June, 1937.

†Young which differ from the adult, as amphibian tadpoles do, are known as larvae.

SALAMANDERS

Salamanders are amphibians in which the tail is retained throughout life. Frogs and toads possess tails in the larval or tadpole stage but lack them as adults.

Salamanders live in moist places and all the Ontario ones except the red-backed and four-toed salamanders deposit their eggs in the water. The life history in general is as follows:

In early spring the adult salamanders congregate at the ponds. The eggs are laid in the water attached to submerged objects and are covered with a protective coating of transparent jelly. They hatch in about two or three weeks. The little tadpoles escape from the jelly and scatter through the pond, swimming freely, and spending much time suspended in the water clear of the bottom. They soon begin to feed upon small animals such as water fleas, wrigglers, etc. At first they breathe like fishes by means of their gills, but as they grow the lungs are developed. After a while the gills are absorbed, their function having been assumed by the lungs, and the little salamanders crawl out upon the land. When cold weather approaches in the autumn they hide away in sheltered places beneath humus in the woods or in the burrows of other animals, where they rest in a dormant condition known as hibernation until the spring comes again.

The red-backed salamander does not place its eggs in water but spends its whole life on land. The young have external gills only for a short time before they emerge from the egg. The mudpuppy, on the other hand, is entirely aquatic, never leaving the water and retaining its external gills throughout life.

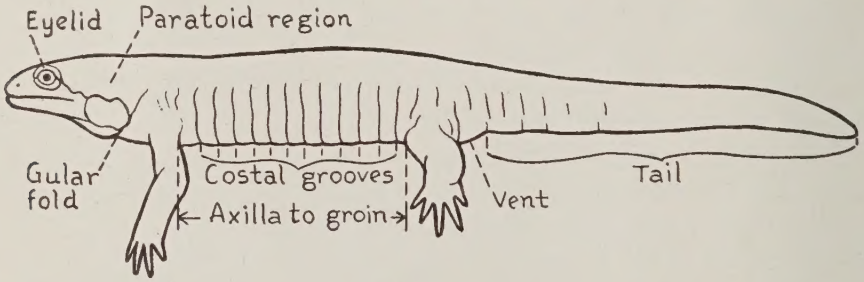

Figure 3
Drawing of Salamander (Ambystoma) illustrating characters used in identification.

Family **NECTURIDAE**

Mudpuppy *Necturus maculosus* (Rafinesque)

Size and structure: Our largest salamander, attains a length of more than a foot. External gills are present throughout life appearing as large tufts of red filaments on each side of the head (Fig. 4); eyelids absent; tail much compressed (flattened on the sides).

Colour: Adults minutely speckled, brownish or olive above with several indefinite rows of large roundish dark spots on the back; a dark stripe from snout through eye. Young specimens have a conspicuous light stripe along each side of the back from the snout to the end of the tail.

Figure 4
Mud puppy.

Habits and habitat: Lives in lakes and streams, and is most active at night, when it forages after aquatic insects, small fish, crayfish, etc. It is occasionally taken with hook and line. It is a strong and fast swimmer, propelling itself with lateral undulations of its body and tail, the limbs meanwhile being held against the sides. The eggs, about sixty or more in number, are laid in May or June, attached each by a single stalk to the ceiling of a cavity beneath a stone, plank, or other object. The female remains with the eggs while they are hatching, which requires between five and six weeks.

Family **SALAMANDRIDAE**

Newt *Triturus viridescens* (Rafinesque)

Size and structure: Length about four inches; body somewhat compressed, tail much so and with a well developed fin, especially in males; skin finely wrinkled; a pair of ridges on top of head converging to snout. (Fig. 5).

Colour: Adults in the water are green, olive or brownish above, abruptly yellow beneath, and marked all over with small black spots; a row of black-margined vermilion spots along each side of the back. After leaving the water at the end of summer the colour becomes paler and more yellowish or reddish. In the immature terrestrial form the colour is vermilion or rich orange, and the small black spots are usually absent.

Habits and habitat: Adults are aquatic in summer in southern Ontario, frequenting ponds and weedy bays of lakes, but apparently leave the water

Figure 5
Newt.

at the end of summer to hibernate on land. Their food consists of small molluscs, crustaceans, insects, worms, etc. The eggs are laid in April or May attached singly to leaves of aquatic weeds beneath the surface, and hatch within three or four weeks. The larval period is completed in about four months, and the young newts after metamorphosis (change from larval to adult form) live a terrestrial life until about three years old, when they return to the water.

Family **AMBYSTOMIDAE**

Jefferson's Salamander *Ambystoma jeffersonianum* (Green)

Size and structure: Length about six or seven inches; form rather slender; head elongate, not swollen at parotoid region (Fig. 3); costal grooves (Fig. 3) usually twelve; toes slender (Fig. 6, a); tail compressed.

Colour: Bluish or brownish black above, paler beneath; sides usually with pale bluish speckles, becoming fainter with age.

Habits and habitat: Early in April these salamanders flock to the ponds where the eggs are laid in small clumps of jelly attached to submerged twigs or grasses. The eggs hatch in from thirteen to eighteen days, and the larval period is finished within about two months. Except during their larval life and at the breeding season, these salamanders are terrestrial, frequenting damp shady places such as those under old logs in the woods. They feed upon insects, worms, small crustaceans, etc.

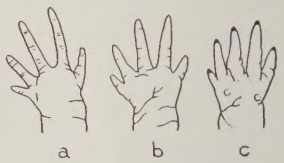

Figure 6
Hind foot, ventral view:
a. Jefferson's Salamander.
b. Spotted Salamander.
c. Tiger Salamander.

Spotted Salamander *Ambystoma maculatum* (Shaw)

Size and structure: Length about six or seven inches; form rather stout; head broad and rounded, swollen at parotoid region; costal grooves usually eleven; toes wider and somewhat flattened (Fig. 6, b); tail compressed. (Fig. 7).

Figure 7
Spotted Salamander.

Colour: Black or bluish above, paler beneath; a row of rounded yellow spots along each side of head, body and tail, and a few similar spots on limbs.

Habits and habitat: Similar to

the preceding species, but spawns a few days later, and the eggs are laid in large instead of small masses of jelly.

Tiger Salamander *Ambystoma tigrinum* (Green)

So far as known this species has been taken only once in Ontario, viz., at Point Pelee, Essex County. Since it occurs in Michigan it should, we think, be found occasionally in the southwestern corner of the province. It should also be looked for near the Minnesota and Manitoba borders. The following description is based on Manitoba specimens.

Size and structure: Length about seven to nine inches; form stout; head rounded and much swollen at parotoid region (Fig. 3); costal grooves (Fig. 3) usually twelve; toes broad, depressed (flattened) and tapering with darkened horny tips (Fig. 6, c); tail long, much compressed.

Colour: Grayish or yellowish olive above, changing to yellow on sides and ventrally, and spotted, marbled or striped with black.

Habits and habitat: In Michigan this salamander is terrestrial through most of the year, living in decaying stumps and the burrows of animals. During March and April it is found in the ponds where the eggs are laid in clumps of jelly attached to submerged plants, etc. Hatching occurs in about two weeks, and the larval period lasts for about three months.

Family **PLETHODONTIDAE**

Four-toed Salamander *Hemidactylium scutatum* (Schlegel)

Size and structure: Length about three inches; head broad, muzzle obtuse; body stoutish and with usually thirteen costal grooves; tail slightly compressed, a well marked constriction at base; hind foot with only four toes.

Colour: Reddish or grayish brown above; belly snow white with small black spots; sides abruptly dark above, fading out below.

Habits and habitat: Frequents sphagnum bogs and damp shady woods in their vicinity. The eggs are laid in May in a loose bundle of usually between twenty and fifty in damp sphagnum moss at the edges of trickles or pools, about six inches above the water and in such a position that the newly hatched larvae can wriggle down into the water, where they evidently spend a short aquatic life before transformation. The female broods with the eggs.

Red-backed Salamander *Plethodon cinereus* (Green)

Size and structure: Length about four inches; form slender and long, head narrow; costal grooves seventeen to nineteen; tail cylindrical; hind foot with five toes. (Fig. 8.)

Figure 8
Red-backed Salamander.

Colour: Occurs in two colour phases, one of which is uniform dark brown or nearly black above, and one in which there is a broad stripe, usually of red, occasionally of dull yellow, down the back from the head to the middle or end of the tail. Upper sides dark brown; ventral surface mottled with dull yellow and gray.

Habits and habitat: Strictly terrestrial. Lives in damp shady situations in the woods, preferring rotting coniferous logs to any other habitat. The eggs are laid from April to July in damp cavities in decaying logs. They are stalked and deposited in grape-like bunches of between three and twelve. The female remains with the eggs.

Two-lined Salamander *Eurycea bislineata* (Green)

Size and structure: Length about four inches; form slender and long, head narrow; costal grooves usually fourteen; tail compressed; hind foot with five toes.

Colour: Yellow or brownish yellow above; a median dorsal row of dark spots and usually a few scattered spots on each side of it; a dark line, often interrupted, along each side of back; sides abruptly dark below this line, mottled, fading out ventrally; yellow or yellowish white beneath, usually unmottled, colour becoming deeper posteriorally.

Habits and habitat: Rather aquatic throughout life; a good swimmer. Inhabits streams and the stony margins of lakes where it may be found in the water or beneath cover near by, or amongst stones and drift at its edge. The eggs, numbering about from twelve to thirty-six, are laid in the water in early summer, attached to the under surface of overhanging stones, etc., and hatch in about a month. The larval period lasts for about two years.

KEY TO ONTARIO SALAMANDERS

A. Adults with external gills (Fig. 4); eyelids absent; young with light dorsolateral stripe from snout to end of tail..... **Mudpuppy**

AA. Adults without external gills; eyelids present.

B. A pair of ridges on top of head (Fig. 5); costal grooves indistinct; belly yellow with many black spots, or red with few or none; two rows of vermilion spots on back..... **Newt**

BB. No ridges on top of head; costal groves distinct.

C. Toes long, outer and inner ones well developed (Fig. 6); teeth on roof of mouth transverse, in front of orbits (Figs. 9, 10, 11).

D. Costal grooves usually 11. Toes broad, somewhat depressed (Fig. 6, b); teeth in 3 patches (Fig. 9); two rows of yellow spots on back (Fig. 7)...**Spotted Salamander**

DD. Costal grooves usually 12.

E. Toes slender, cylindrical (Fig. 6, a); teeth in 4 patches (Fig. 10); no yellow spots on back. **Jefferson's Salamander**

EE. Toes broad, depressed, tapering (Fig. 6, c), with horny tips; teeth in 1 patch (Fig. 11); spotted or marbled with black on olive or yellow ground colour.....**Tiger Salamander**

CC. Toes short, outer and inner ones much reduced; main toothpatches on roof of mouth longitudinal, backward from between orbits (Fig. 12).

F. Hind foot with 4 toes; tail constricted at base. Costal grooves 13; belly white with black spots.....**Four-toed Salamander**

FF. Hind foot with 5 toes; tail not constricted at base.

G. Tail cylindrical; costal grooves 17-19; belly dusky, mottled with gray and dull yellow.....**Red-backed Salamander**

GG. Tail compressed; costal grooves 14; belly yellow, unmottled.....**Two-lined Salamander**

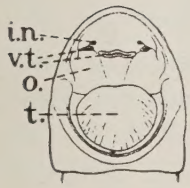

Figure 9
Mouth of spotted salamander showing teeth. i.n. internal nostril; v.t. vomerine teeth; o. orbit; t. tongue.

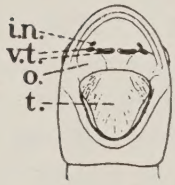

Figure 10
Mouth of Jefferson's salamander showing teeth. i.n. internal nostril; v.t. vomerine teeth; o. orbit; t. tongue.

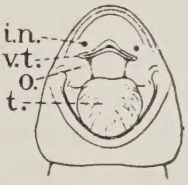

Figure 11
Mouth of tiger salamander showing teeth. i.n. internal nostril; v.t. vomerine teeth; o. orbit, t. tongue.

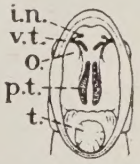

Figure 12
Mouth of red-backed salamander showing teeth. i.n. internal nostril; v.t. vomerine teeth; o. orbit; p.t. parasphenoid teeth; t. tongue.

FROGS, TREE FROGS and TOADS

The frogs, tree frogs (also called tree toads), and toads are so similar in general form and life history, that they may conveniently be discussed together. They agree in having much larger hind legs (an adaptation for jumping and swimming) than front legs, and in lacking a tail in the adult state. In most frogs the toes of the hind feet are more or less webbed, enabling them the better to swim, when they enter the water.

The eggs are laid in the quiet water of some pond or sheltered bay in spring or early summer, and are enclosed in a protective coating of transparent jelly. When the tiny tadpoles first emerge, they possess external gills; they also have suckers on the lower surface of their heads by means of which they attach themselves to plants or other objects. As they develop, the skin on the sides of the head grows backward, covering the gills and becoming fused to the sides of the body, except for a small opening on the left side called the *spiracle*.. (Fig. 2 sp.) Later the suckers disappear, the mouth develops horny jaws and lip-teeth, and the little tadpoles begin to feed. The intestine lengthens and may be seen, coiled like a watch spring, within the transparent skin of the belly. As the tadpoles grow, the limbs develop. The hind limbs appear first as tiny buds at each side of the base of the tail and gradually increase in size. At the same time, the front limbs are developing beneath the gill covers. When the time for transformation to the adult form arrives, the lungs are able to function in place of the gills, which are then absorbed. The front limbs break through. The mouth widens, loses its horny jaws and lip-teeth of the tadpole period, and develops true teeth. The tail begins to reduce in size through being absorbed, and the little froglet, still possessing a considerable portion of its tadpole tail, crawls out on land. In a few days the rest of the tail disappears, and the transformation (metamorphosis) is complete.

The food of the tadpole consisted of plant tissues and some dead animal matter that was rasped off in tiny particles with the lip-teeth and the horny jaws. The food of the adult frog is quite different; it consists mostly of insects, but includes also such animals as spiders, millipedes, woodlice, snails, etc. These are picked up by means of the sticky tongue which is suddenly thrust out and withdrawn. In this manner the food is taken into the mouth and swallowed whole.

All Ontario frogs and toads hibernate during the winter, that is, they pass into a dormant state in which the life processes are slowed down nearly to a stand-still. Four of the species, viz., the bullfrog, the green frog, the pickerel frog, and the leopard frog hibernate beneath the water, the other species on land. Those hibernating on land bury themselves under logs, beneath dead leaves, etc., or in the soil. The toads burrow into the ground, the horny tubercles under their feet assisting them in this.

All the Ontario species become vocal at the breeding season, the males only calling; each species has its own characteristic call or song.

Family **BUFONIDAE. THE TOADS**

Our toads are distinguished by their dry, warty skin and especially by the possession of parotoid glands (Fig. 13, p.g.), bean-shaped swellings behind the eye on each side of the back.

In Ontario two species occur, the Common or American Toad which is widely distributed, and Fowler's Toad, confined in Ontario, so far as our present knowledge is concerned, to a few localities along the north shore of Lake Erie.

American Toad (*Bufo americanus* (Holbrook) (Fig. 13)

Size and structure: Reaches a larger size than Fowler's toad, occasional specimens being 4 inches in body length. Skin more warty than in Fowler's.

A pair of ridges, the *cranial crests* (Fig. 13 c.c.), lie lengthwise between eyes converging to snout; another pair, the *postorbital crests* (Fig. 13 p.o.c.), lie crosswise behind eyes from cranial crests to above ears; a bean-shaped swelling, the *parotoid gland* (Fig. 13 p.g.), behind eye on each side, is distinct and separate from the postorbital crest; a short ridge, the *preparotoid crest* (Fig. 13 p.p.c.), is usually present connecting the parotoid gland with the postorbital crest; a pair of horny tubercles on hind foot, the inner one larger and somewhat blade-shaped.

Colour: Exceedingly variable, usually some shade of brown, often yellowish, reddish or grayish (or greenish in males); a light midorsal stripe is nearly always present; back and sides irregularly blotched or marbled with dark brown and (or) black; usually three or four dark blotches on each side of back, each enclosing one or two (occasionally more) large warts; under surface dull yellowish or cream, usually with dark spots or mottling.

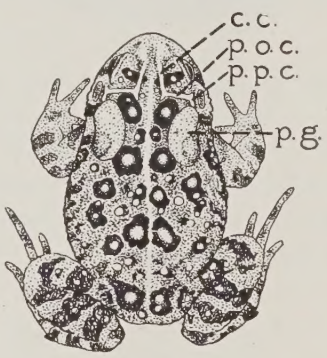

Figure 13
American toad.
c.c. Cranial crest,
p.o.c. Postorbital crest,
p.p.c. Preparotoid crest,
p.g. Parotoid gland.

Habits and habitat: Common about farms, gardens and light woods where it hides during the day, coming out at evening in search of insects, earthworms, etc. Because of its destruction of cutworms and other farm and garden pests, the value of a single toad has been estimated at more than $5.00 a year to the farmer. Breeding occurs from late April into June or July, but is usually finished in May in southern Ontario. The eggs are laid in long strings of jelly about grasses and weeds in shallow water of ponds, quiet streams, etc., and hatch in from three to twelve days, depending on temperature. The tadpole stage lasts for six or seven weeks. The males are vocal while at the water in the spawning season, and the song is a long sustained rather high pitched trilling note of de-

cidedly musical quality. After spawning, the toads leave the water and are terrestrial for the rest of the year.

Fowler's Toad *Bufo fowleri* (Hinkley) (Fig. 14)

Size and structure: Length of body usually about two to two and a half inches (occasionally up to three and a quarter); skin dry and finely warty, surface rather smoother than in American toad.

The head crests are much the same as in *americanus* except that the postorbital crests are closely in contact with, or imperfectly separated from, the parotoid glands, and there are no preparotoid crests; hind feet with horny tubercles as in *americanus*.

Figure 14
Fowler's toad.

Colour: General colour above usually greenish; a marbled pattern of darker tones of brownish, grayish or greenish on a yellowish, buffy or greenish ground colour; a few (four or five) more or less paired dark blotches surrounding the groups of larger warts which may number from one to six or seven in a blotch; mid-dorsal stripe yellow or buff; *ventral surface unspotted.*

Habits and habitat: In Ontario this toad is restricted to the vicinity of Lake Erie and seems to prefer sandy beaches. It remains buried in the sand during the day and comes out at evening. It breeds later than the American toad living in the same region, its season starting late in May in Ontario. The males are very noisy at this time; the call is a short screech with something of a buzzing tone and not at all musical.

Family **HYLIDAE. TREE-FROGS**

Cricket Frog *Acris gryllus* (LeConte)

Size and structure: Body length about an inch; general appearance that of a small pond frog rather than a tree-frog; disks on fingers and toes so small as to be scarcely noticeable; *toes almost fully webbed*; skin rough and warty.

Colour: Brown or green above, normally with three oblique dark bars on each side of back (in the Ontario specimen at hand the oblique bars are absent, but there are a few dark spots of irregular arrangement); ventral surface yellowish white.

Habits and habitat: Although this frog belongs to the tree-frog family, it is terrestrial and aquatic in habits, living about the margins of streams and ponds. There is only one record of its capture in Ontario, viz., at Point Pelee, Essex County. It is suggested that students in southern

Ontario look for this species, and, if they find it, report it to the Museum.

Swamp Tree-Frog *Pseudacris triseriata* (Wied)

Size and structure: Body length about an inch to an inch and a third; form slender; legs moderately long, about three quarters to four fifths of combined length of head and body; disks on fingers and toes minute; *toes webbed only at base*; skin smoothly granular.

Colour: Usually some tone of brown above; a dark stripe from snout through eye and backward along side of body; three dark stripes down back, either continuous or broken; dark blotches on legs; yellowish white beneath.

Habits and Habitat: The swamp tree-frog is terrestrial through most of the year, frequenting damp situations about marshes and in the woods. It is a poor swimmer and climber. In April the frogs congregate mostly at temporary ponds, where the eggs are laid in small masses of jelly attached to grasses or twigs. The eggs hatch in about two weeks, and transformation occurs in June. The song is a loud stridulating sound of ascending pitch and quite like the sound produced by drawing the edge of a knife blade across the teeth of a vulcanite comb.

Figure 15
Swamp tree-frog.

In western Ontario near the Manitoba and Minnesota boundaries another swamp tree-frog, *Pseudacris septentrionalis* (Boulenger), occurs and ranges westward and northward from Minnesota and Ontario. In this frog the hind legs are shorter, the length to the heel varying from a little more than half to about three quarters of the combined length of head and body. The colour above is often greenish brown or green.

Spring Peeper, Pickering's Hyla *Hyla crucifer* Wied

Size and structure: Body length about an inch to an inch and a quarter; disks on fingers and toes well developed; toes about half webbed, three joints of fourth toe free; skin somewhat granular, more so ventrally.

Colour: Ground colour above usually some tone of brown, occasionally yellow or reddish; a dark X-shaped mark on the back is present in all colorations, as is also a dark stripe from snout through eye continuing along side; belly creamy or yellowish.

Habits and habitat: The peeper spends the summer in damp places in the woods, about the edges of marshes, and in orchards and gardens. It is a good climber and may often be found on low bushes or tall weeds. Breeding occurs in April and May in southern Ontario. The eggs are laid singly attached to twigs or grasses and hatch in from six to fifteen days. The tadpole stage lasts two or three months. The males are musical while at the water, emitting short, high pitched whistles.

Figure 16
Spring Peeper.

Tree-Frog, Tree-Toad *Hyla versicolor* (Le Conte)

Size and structure: Body length about one and a half to two inches; form stout, squat and toad-like; skin rough and tuberculate; disks on fingers and toes large, well developed; toes webbed nearly to tips, two joints of fourth toe free; fingers webbed at base.

Colour: Ground colour above varies from ashy gray to green, or brown; a dark stripe from snout through eye onto side of body; a large light spot from beneath eye to lip; a dark star-shaped mark on back; axilla, groin and under surfaces of hind limbs orange. This frog changes its colour readily to harmonize with its surroundings. In pale green colorations the dark marks on the back may be absent and the dark bands on the limbs nearly so, but the dark stripe along the side of the face and the light spot beneath the eye are always evident.

Figure 17
Tree Frog.

Habits and habitat: The tree-frog is terrestrial and arboreal throughout the year except at the short breeding season which in southern Ontario occupies only from one to three nights in the latter part of May. The eggs are laid in small masses of jelly floating at the surface in quiet ponds. Hatching occurs in four or five days and the tadpole stage lasts from forty-five to sixty-five days. The males are musical while at the water and for one or two nights before and after. The song is a loud trilling or high pitched purring sound of short duration repeated at intervals of a few seconds. When spawning is over these frogs scatter over woodlands, farms and gardens where they may often be heard throughout the summer on wet or cloudy days or warm, humid nights.

Family **RANIDAE. POND FROGS**

Bullfrog *Rana catesbeiana* Shaw

Size and structure: Our largest frog, sometimes exceeding six inches in body length. *Dorso-lateral folds (Fig. 18) absent*; toes webbed to tips, leaving only last joint of fourth toe free.

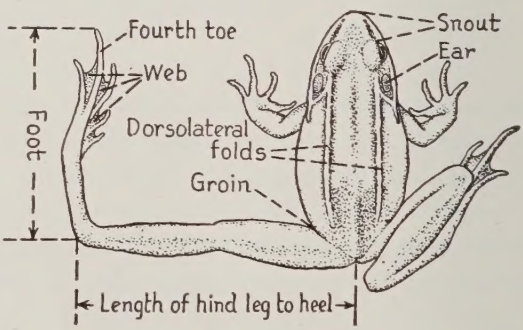

Figure 18
Diagram of frog showing parts referred to in key and descriptions.

Colour: Green or greenish brown above, often blotched or marbled with darker brown; limbs blotched or barred; ventral surface yellowish white, usually with some darker mottling.

Habits and habitat: A very aquatic frog inhabiting lakes, quiet parts of rivers, and large permanent ponds with deep water. Most of the egg laying probably occurs in June in southern Ontario. The eggs are laid in large floating masses of jelly and require four days or more to hatch. The tadpole stage lasts for two years, metamorphosis usually occurring in July following the second winter. The voice of the males is a deep bellowing note often described as "jug-o-rum" and may be heard for a long distance.

Green Frog *Rana clamitans* Latreille

Size and structure: Body length about three to four inches. Sometimes confused with Bullfrog, but always distinguishable by the well developed dorso-lateral folds, Fig. 18; feet extensively webbed, but leaving two joints of fourth toe free.

Colour: Ground colour above usually greenish brown, often bright green on head and shoulders, occasionally all green; back usually with small dark spots; limbs with dark bars; ventral surface white, often more or less mottled; throat of male yellow.

Habits and habitat: Decidedly aquatic, inhabiting lakes, large ponds, rivers, and cold springs. Most of the egg laying in southern Ontario probably occurs in late May and early June. The eggs are laid in masses of floating jelly and hatch in from three to six days. The tadpole stage lasts for one year. The males are musical at the spawning season and may be heard occasionally through the summer. The note is an explosive base "bung" or "plung" and sounds much like the plucking of an elastic cord stretched not too tightly over an empty box. It is often repeated several times or may be followed by several croaking notes.

Leopard Frog *Rana pipiens* Schreber

Size and structure: Body length three to four inches; dorso-lateral folds conspicuous, several smaller glandular folds between them; toes more than half webbed.

Colour: Green or brown above; usually two rows of *rounded* dark spots *with light borders* between the dorso-lateral folds and often a few extra spots between the rows; similar spots on sides; legs with light bordered dark bars; ventral surface white or yellowish white. *No brilliant yellow on groin region or beneath hind legs.*

Figure 19
Leopard Frog.

Habits and habitat: Only moderately aquatic; common about ponds, streams, marshes, and weedy bays of lakes, and often wandering up into meadows well away from the water. Spawning occurs in April and May in southern Ontario. The eggs are laid in large masses of jelly attached

to twigs, etc., or unattached on the bottom, in shallow water. Two weeks or more are usually required for hatching, and the tadpole stage lasts for sixty to eighty days. The males are vociferous during the breeding season; the croak is a long, low pitched sound of about three seconds duration, followed by three or more shorter notes.

Pickerel Frog *Rana palustris* Le Conte

Size and structure: Superficially resembles Leopard frog except in size and coloration; body length 2 to 3 inches.

Colour: Brown above; two rows of closely set, *squarish,* dark spots *without light borders* (or with borders only faintly light) on back between dorso-lateral folds, and often a few extra spots between the rows; similar squarish spots on sides. The rows of spots both above and below the dorso-lateral folds crowd close to, and end abruptly at the edges of these folds, giving them a clean cut and brilliant appearance. Legs with dark bars; ventral surface white anteriorally, becoming yellow posteriorally; *groin region and under surfaces of hind legs brilliant yellow or orange.*

Figure 20
Pickerel Frog.

Habits and habitat: More aquatic than the Leopard frog; prefers streams and cold springs and does not wander far from the water. It breeds later than the Leopard frog and in southern Ontario most of the egg laying probably occurs in May. The eggs are deposited in masses of jelly attached to twigs or grass stems beneath the surface, usually in shallow water, and hatch in two or three weeks. The tadpole period lasts for about eighty days. The males croak during the breeding season. The low pitched note is suggestive of the Leopard frog's, but is shorter and feebler.

Mink Frog *Rana septentrionalis* Baird

Size and structure: Body length about two to three inches; form medium; skin smooth; *dorso-lateral folds usually absent, imperfectly developed or interrupted* (occasionally fairly well developed); feet broadly webbed; usually one joint of fourth toe free and others webbed to tips.

Colour: Variable; ground colour either all olive brown above, or, green on head and shoulders and becoming olive brown behind shoulder region; a few large, soft-edged dark brown spots on back, usually with a marbled pattern of lighter brown between them; head and shoulders often show a finer marbling of black or dark brown; limbs blotched; ventral surface yellowish white; throat of mature male yellow.

Habits and habitat: An aquatic frog inhabiting rivers and lakes, and

when in lakes seeming to prefer the vicinity of outlets or inlets where there is a gentle current. Breeding occurs in June and July; the eggs are laid in large masses of jelly attached to stems of water plants, etc. beneath the surface. The tadpole stage lasts for a year. The croak of the male resembles the sound of hammering on wood.

The peculiar mink-like odour which this frog emits when first picked up in the wild state is a good field character for its identification.

Wood Frog *Rana sylvatica* Le Conte

Size and structure: Body length about one and three-eighths to two inches; dorso-lateral folds well developed; toes about three-quarters webbed, leaving one or two joints of fourth toe free.

Colour: Varies from very light to dark brown and may be reddish or greenish; *a dark line from snout through eye and a large, somewhat triangular dark spot behind eye covering ear* are always present; sides usually with some scattered dark spots; limbs dark barred; ventral surface white, with or without mottling. In northern specimens there is sometimes a white line down the middle of the back and along the upper surface of the hind legs.

Habits and habitat: The most terrestrial of our pond frogs, frequenting damp, shady woods where it may often be found at a long distance from water. In southern Ontario spawning occurs in April when the frogs congregate at ponds and temporary woodland pools. The eggs are deposited in masses of jelly attached to twigs, etc., beneath the surface and hatch in from two to three weeks. The males are very noisy while at the ponds, uttering an incessant high-pitched croaking, but are silent for the rest of the year.

The wood frogs of Ontario are sometimes regarded as belonging to two species, *R. sylvatica* and *R. cantabrigensis*. In *R. cantabrigensis*, which is of northward and westward distribution, the length of the hind leg to the heel is usually less than the combined length of head and body, while in *R. sylvatica* the length of the hind leg to the heel usually exceeds the head-body length. The two appear to intergrade completely and no sharp distinction can be drawn between them. Both forms, and intermediates, occur in Ontario.

KEY TO ONTARIO FROGS, TREE FROGS AND TOADS

A. Parotoid glands and cranial crests (Fig. 13) present.
  B. Postorbital crests separated by a distinct space from parotoid glands; preparotoid crests usually present (Fig. 13); chest usually spotted or mottled..... **American Toad**
  BB. Postorbital crests in close contact with, or imperfectly separated from, parotoid glands; no preparotoid crests (Fig. 14); chest unspotted..... **Fowler's Toad**
AA. Parotoid glands and cranial crests absent.
  C. Fingers and toes with adhesive disks on tips (Figs. 16 and 17).
    D. Adhesive disks minute, no wider than digits (Fig. 15).

E. Skin rough; toes almost fully webbed .... **Cricket Frog**

EE. Skin rather smooth; toes webbed only at base..... **Swamp Tree-Frog**

DD. Adhesive disks large, about twice as wide as digits (Figs. 16 and 17).

F. Toes about half-webbed; fingers not webbed; back with dark X-shaped mark (Fig. 16); groin region not brilliant yellow or orange..... **Spring Peeper**

FF. Toes webbed nearly to tips; fingers webbed at base; back with dark irregular star-shaped mark (Fig. 17); groin brilliant yellow or orange..... **Tree-Frog**

CC. Fingers and toes without adhesive disks (Fig. 18).

G. Dorsolateral folds well developed and webs leaving more than one joint of fourth toe free (Fig. 18).

H. A dark triangular blotch behind eye covering ear; general colour brown, but no pattern of large dark spots on back..... **Wood Frog**

HH. No dark triangular blotch covering ear.

J. Back with two rows of large dark spots; extra folds on skin between dorsolateral folds; skin smooth.

K. Dorsal spots roundish, light edged, not very closely spaced (Fig. 19); groin region not brilliant yellow. **Leopard Frog**

KK. Dorsal spots squarish, scarcely or not light edged, closely spaced, ending abruptly at edges of dorsolateral folds (Fig. 20); groin region brilliant yellow..... **Pickerel Frog**

JJ. Back without large dark spots; no extra folds between dorsolaterals; skin often slightly rough with small tubercles; colour above green or brown, often with small scattered dark spots on back..... **Green Frog**

GG. Dorsolateral folds incomplete or absent; webs leaving not more than one joint of fourth toe free.

L. Dorsolateral folds absent; web leaving last joint of fourth toe free; back roughened with tubercles or small warts; brownish green above, often with some darker blotching or marbling..... **Bullfrog**

LL. Dorsolateral folds incomplete or absent; webs leaving last joint of fourth toe free; colour above olive brown, back usually with a few large roundish dark spots with soft light margins, and a tracery of light and dark markings between them..... **Mink Frog**